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Stolowitz Ford Cowger LLP 621 SW Morrison St Suite 600 Portland, OR 97205			EXAMINER VO, QUANG N	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/695,327	Applicant(s) HUANG ET AL.	
	Examiner Quang N. Vo	Art Unit 2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 July 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 18-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 18-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Regarding claim 1, applicant argues that the compression method of Maurer is directed to a method for reducing image noise is improper.

In response: Maurer discloses a method for reducing image noise (e.g., Bit-depth of the luminance channel is reduced to discard visually unimportant information to a level where visual artifacts are virtually unnoticeable, column 2, lines 45-48. Note: examiner interprets image noise is any kind of noise or artifacts in the image.).

Regarding claim 1, applicant argues that it is improper to interpret Maurer as combining the 2x2 block of pixels of the downsampling process 108 with reduced color level image associated with the bit depth truncation 106.

In response: examiner interprets that the color level is combined of chrominance channel and luminance channel by convention. Thus either downsampled 2x2 block of pixels of chrominance channel or the bit-depth truncated of the luminance channel have an effect of color level. Although the chrominance channel and the luminance channel process separately, but at the end these two components are combined to have color level (figure 2).

Regarding claim 2, applicant argues that the bit-depth truncation of Maurer fails to disclose the bit enhanced method recited by claim 2.

In response: examiner interprets that because Bit-depth of the luminance channel is reduced to discard visually unimportant information to a level where visual

Art Unit: 2625

artifacts are virtually unnoticeable (column 2, lines 44-47). Thus bit-depth truncation is a bit enhanced method.

Regarding claim 6, applicant argues that Maurer fails to disclose how the bit depth truncation of luminance channel and downsampling process of chrominance channel combined.

In response: Examiner interprets image level is color level since image level is not defined in the application specification. Since color level is combined of chrominance channel and luminance channel and chrominance is usually represented as two color different components: (blue - luminance) and (red - luminance) by convention. Thus there is a relationship between chrominance and luminance and these two component combined to have color level. Therefore the reduced number of bits in luminance channel and downsampling by the matrix of pixels of chrominance channel both affect the color level.

Regarding claim 7, applicant argues that Examiner has failed to provide adequate basis for suggesting that the matrix of pixels associated with the downsampling process 108 is in any way dependent or related to a number of bits associated with the Y channel of the bit-depth truncation 106, so as to disclose wherein the color level of the pattern depends on the number of bits reduced from the full color level, as recited by claim 7.

In response: Maurer differs from claim 7, in that he does not explicitly teach the color level of the pattern depends on the number of bits reduced from the full color level.

Art Unit: 2625

Maurer discloses in general, the luminance channel has the bit depth may be truncated down about 2 bits (column 2, lines 44-51); and each chrominance channel may be down-sampling by factor of 2 by replacing 2x2 matrix of pixels by a single pixel (column 2, lines 60-64); and since color is combined of chrominance channel and luminance channel. Thus number of bits reduced can set equal to the size of the pattern like 2x2 matrix.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have recognized Maurer is having teaching the color level of the pattern depends on the number of bits reduced from the full color level, or at least obvious to provide functional part for performing the color level of the pattern depends on the number of bits reduced from the full color level.

Regarding claim 8, applicant argues that it would not be obvious to combine the downsampling with 2x2 matrix of chrominance channel and and the bit depth truncation of luminance channel.

In response: Maurer differs from claim 8, in that he does not explicitly teach composing a halftone pattern with a reduced image level corresponding to the decreased number of bits.

Maurer discloses in general, the luminance channel has the bit depth may be truncated down about 2 bits (column 2, lines 44-51); and each chrominance channel may be down-sampling by factor of 2 by replacing 2x2 matrix of pixels by a single pixel (column 2, lines 60-64); and since color is combined of chrominance channel and

Art Unit: 2625

luminance channel. Thus number of bits reduced can set equal to the size of the pattern like 2x2 matrix for color level, which is combined of chrominance and luminance.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have recognized Maurer is having teaching composing a halftone pattern with a reduced image level corresponding to the decreased number of bits, or at least obvious to provide functional part for performing composing a halftone pattern with a reduced image level corresponding to the decreased number of bits.

Regarding claim 10, applicant argues that the 2x2 matrix is explicitly described by Maurer as being comprised of pixels. The number of pixels in the matrix associated with the chrominance channel is unrelated to the number of bits associated with the Y channel.

In response: Since color level is combined of chrominance channel and luminance channel and chrominance is usually represented as two color different components: (blue - luminance) and (red - luminance) by convention. Thus there is a relationship between chrominance and luminance and these two component combined to have color level. Therefore the reduced number of bits in luminance channel and downsampling by the 2x2 matrix of pixels of chrominance channel effect each other and at the end both component combined to represent color level (e.g., figure 2).

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

Art Unit: 2625

art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 6, 24 and 25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 6, in particular, the limitation "reducing an image level of one or more pixels of the image by subtracting a number of bits of image data from each of the one or more pixels" is not defined in the specification.

Regarding claim 24, in particular, the limitation "wherein one or more of the full image level, the reduced image level and the image level comprise a color level." is not defined in the specification.

Regarding claim 25, in particular, the limitation "wherein one or more of the full image level, the reduced image level and the image level comprise a gray level." is not defined in the specification.

Claims 6, 24 and 25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Art Unit: 2625

Regarding claim 6, in particular, the limitation "reducing an image level of one or more pixels of the image by subtracting a number of bits of image data from each of the one or more pixels" is not defined in the specification.

Regarding claim 24, in particular, the limitation "wherein one or more of the full image level, the reduced image level and the image level comprise a color level." is not defined in the specification.

Regarding claim 25, in particular, the limitation "wherein one or more of the full image level, the reduced image level and the image level comprise a gray level." is not defined in the specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Maurer et al. (Maurer) (US 6,650,773).

With regard to claim 1, Maurer discloses a method for reducing image noise (e.g., Bit-depth of the luminance channel is reduced to discard visually unimportant information to a level where visual artifacts are virtually unnoticeable (e.g., small contouring artifacts might be barely noticeable), column 2, lines 45-48. Note: examiner

Art Unit: 2625

interprets image noise is any kind of noise or artifacts in the image.) in a scanned image comprising: decreasing a color level of the scanned image by reducing a number of bits of a full color level of one or more pixels in the scanned image to form a reduced color level image (e.g., the luminance channel is bit-depth truncated (block 106), an 8-bit luminance channel may be truncated to five bits, figure 1, column 2, lines 44-51. Note: examiner interprets color is combined of chrominance and luminance by convention. Thus either chrominance or luminance reduce, the color level image must reduce, for example: $C = A + B$, either A or B reduced, C must reduce. In this case, the luminance channel is bit-depth truncated (bit depth reduced). Therefore the color level reduced); composing a pattern (e.g., pattern 2 x 2 from down-sampling of block 110, figure 1, column 2, lines 58-65) having less color level than the full color level (e.g., the reconstructed chrominance channels are interpolated to their original resolution if the chrominance channels were downsampled during compression (block 156), column 3, lines 47-51. Note: examiner interprets the pattern used to downsampled the chrominance to reduce resolution (column 2, lines 61-64); and later the chrominance is reconstructed to original resolution (column 3, lines 47-51). Thus, the pattern must have less color level than chrominance level because after downsampled, the chrominance level just reduced resolution (chrominance level reduced)); recombining the full color level of the one or more pixels (e.g., pattern 2x2 from down-sampling, column 2, lines 58-65) in the scanned image, by combining the reduced color level image with the pattern (e.g., the reconstructed chrominance channels are interpolated to their original

Art Unit: 2625

resolution if the chrominance channels were downsampled during compression (block 156), column 3, lines 47-51, column 3, lines 47-51).

With regard to claim 2, Maurer discloses wherein the reduced color level image and the pattern are combined using a bit enhanced method (e.g., bit-depth truncation, block 106, column 2, lines 44-48. Note: examiner interprets that because Bit-depth of the luminance channel is reduced to discard visually unimportant information to a level where visual artifacts are virtually unnoticeable. Thus bit-depth truncation is a bit enhanced method).

With regard to claim 3, Maurer discloses wherein combining the reduced color level image with the pattern (e.g., pattern 2x2 from down-sampling, column 2, lines 58-65) restores the one or more pixels (e.g., the reconstructed chrominance channels are interpolated to the their original resolution, column 3, lines 48-51) to include a same number of bits as before the color level is decreased (e.g., the luminance channel is reconstructed according to the same lossless standard, column 3, lines 44-45. Note: examiner interprets the reconstructed luminance channel restoring a same number of bits).

With regard to claim 4, Maurer discloses wherein the pattern comprises a halftone pattern (e.g., 2x2 pattern from down-sampling, column 2, lines 58-65).

With regard to claim 5, Maurer discloses wherein the number of bits reduced from the full color level is set to an image noise level (e.g., Bit-depth of the luminance channel is reduced to discard visually unimportant information to a level where visual artifacts are virtually unnoticeable (e.g., small contouring artifacts might be barely

Art Unit: 2625

noticeable), column 2, lines 45-48. Note: examiner interprets image noise is any kind of noise or artifacts in the image.).

With regard to claim 22, the subject matter is similar to claim 5. Therefore claim 22 is rejected as set forth above for claim 5.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-13, 18-21, 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maurer et al. (Maurer) (US 6,650,773).

Regarding claim 6, Maurer discloses a method for reducing noise in an image (e.g., Bit-depth of the luminance channel is reduced to discard visually unimportant information to a level where visual artifacts are virtually unnoticeable (e.g., small contouring artifacts might be barely noticeable), column 2, lines 45-48. Note: examiner interprets image noise is any kind of noise or artifacts in the image.), comprising: reducing a image level of one or more pixels of the image by subtracting a number of bits of image data from each of the one or more pixels (e.g., the luminance channel is bit-depth truncated (block 106), an 8-bit luminance channel may be truncated to five bits, figure 1, column 2, lines 44-51. Note: examiner interprets image level is color level and color is combined of chrominance and luminance by convention. Thus either

Art Unit: 2625

chrominance or luminance reduce, the color level of image must reduce, for example: $C = A + B$, either A or B reduced, C must reduce. In this case, the luminance channel is bit-depth truncated (bit depth reduced). Therefore the color level also reduced); and restoring the image level of the one or more pixels using a halftone pattern comprising a matrix ((e.g., pattern 2x2 from down-sampling, column 2, lines 61-65).

Maurer differs from claim 6 in that he does not explicitly disclose wherein the row and column numbers of the matrix pattern are dependent on the number of bits reduced in the step of reducing a plurality of bits of the scale of each pixel in the image.

Since Maurer discloses in general, the luminance channel has the bit depth may be truncated down from 1 to 3 bits and including truncated to 2 bits (column 2, lines 44-51); and each chrominance channel may be down-sampling by factor of 2 by replacing 2x2 matrix of pixels by a single pixel (column 2, lines 60-64). Thus a number of rows and a number of columns of the matrix used for downsampled chrominance channel correspond to the number of bits of image data subtracted from the one or more pixels of the luminance channel; and color is combined of chrominance channel and luminance channel.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have recognized Maurer is having teaching the row and column numbers of the matrix pattern are dependent on the number of bits reduced in the step of reducing a plurality of bits of image data subtracted from the one or more pixels, or at least obvious to provide functional part for performing the row and column numbers of

Art Unit: 2625

the matrix pattern are dependent on the number of bits of image data subtracted from the one or more pixels.

With regard to claim 7, Maurer differs from claim 7, in that he does not explicitly teach the color level of the pattern depends on the number of bits reduced from the full color level.

Maurer discloses in general, the luminance channel has the bit depth may be truncated down about 2 bits (column 2, lines 44-51); and each chrominance channel may be down-sampling by factor of 2 by replacing 2x2 matrix of pixels by a single pixel (column 2, lines 60-64); and since color is combined of chrominance channel and luminance channel. Thus number of bits reduced can set equal to the size of the pattern like 2x2 matrix.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have recognized Maurer is having teaching the color level of the pattern depends on the number of bits reduced from the full color level, or at least obvious to provide functional part for performing the color level of the pattern depends on the number of bits reduced from the full color level.

With regard to claim 8, Maurer discloses a method for reducing image noise (e.g., Bit-depth of the luminance channel is reduced to discard visually unimportant information to a level where visual artifacts are virtually unnoticeable (e.g., small contouring artifacts might be barely noticeable), column 2, lines 45-48. Note: examiner interprets image noise is any kind of noise or artifacts in the image.) comprising: reducing a full image level of one or more pixels in the image by decreasing a number

Art Unit: 2625

of bits according to the image noise (e.g., Bit-depth of the luminance channel is reduced to discard visually unimportant information to a level where visual artifacts are virtually unnoticeable, column 2, lines 44-47. Note: examiner interprets image level is color level and color is combined of chrominance and luminance by convention. Thus either chrominance or luminance reduce, the color level image must reduce, for example: $C = A + B$, either A or B reduced, C must reduce. In this case, the luminance channel is bit-depth truncated (bit depth reduced). Therefore the color level reduced); and recombining the image level of the one or more pixels in the image using the halftone pattern (e.g., figure 2, column 3, lines 37-51).

Maurer differs from claim 8, in that he does not explicitly teach composing a halftone pattern with a reduced image level corresponding to the decreased number of bits.

Maurer discloses in general, the luminance channel has the bit depth may be truncated down about 2 bits (column 2, lines 44-51); and each chrominance channel may be down-sampling by factor of 2 by replacing 2x2 matrix of pixels by a single pixel (column 2, lines 60-64); and since color is combined of chrominance channel and luminance channel. Thus number of bits reduced can set equal to the size of the pattern like 2x2 matrix for color level, which is combined of chrominance and luminance.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have recognized Maurer is having teaching composing a halftone pattern with a reduced image level corresponding to the decreased number of bits, or at

Art Unit: 2625

least obvious to provide functional part for performing composing a halftone pattern with a reduced image level corresponding to the decreased number of bits.

With regard to claim 9, Maurer discloses wherein a number of bits in the recombined image level is the same as a number of bits in the full image level (column 3, lines 47-51).

With regard to claim 10, Maurer differs from claim 10 in that he does not explicitly teach wherein the halftone pattern comprises a matrix having a number of rows equal to the decreased number of bits.

Since Maurer discloses in general, the luminance channel has the bit depth may be truncated down about 2 bits (column 2, lines 44-51); and each chrominance channel may be down-sampling by factor of 2 by replacing 2x2 matrix of pixels by a single pixel (column 2, lines 60-64); and since color is combined of chrominance channel and luminance channel. Thus number of bits reduced can set equal to the size of the pattern like 2x2 matrix for color level, which is combined of chrominance and luminance.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have recognized Maurer is having teaching wherein the halftone pattern comprises a matrix having a number of rows equal to the decreased number of bits, or at least obvious to provide functional part for performing wherein the halftone pattern comprises a matrix having a number of rows equal to the decreased number of bits.

With regard to claim 11, Maurer discloses wherein the halftone pattern comprises a matrix having a number of column (e.g., chrominance channel may be down-sampled

Art Unit: 2625

by a factor of 2 and pattern 2x2 from down-sampling, column 2, lines 60-65) equal to the decreased number of bits the luminance channel has the bit depth may be truncated down about 2 bits (column 2, lines 44-51).

With regard to claim 12, Maurer discloses further comprising displaying the image including the recombined image level on a computer monitor (e.g., block 160, figure 2).

With regard to claim 13, Maurer discloses further comprising filling out missing codes of the one or more pixels of the image using a bit enhance method (e.g., the interpolation may be performed by pixel replication, column 3, lines 47-51).

Referring to claim 18:

Claim 18 is the apparatus claim corresponding with method steps in claim 8. Therefore claim 18 is rejected as set forth above for claim 8.

Referring to claim 19:

Claim 19 is the apparatus claim corresponding with method steps in claim 9. Therefore claim 19 is rejected as set forth above for claim 9.

With regard to claim 20, the subject matter is similar to claims 10 and 11. Therefore claim 20 is rejected as set forth above for claims 10 and 11.

With regard to claim 21, the subject matter is similar to claim 9. Therefore claim 21 is rejected as set forth above for claim 9.

Art Unit: 2625

With regard to claim 23, the subject matter is similar to claim 7. Therefore claim 23 is rejected as set forth above for claim 7.

With regard to claim 24, Maurer discloses wherein one or more of the full image level, the reduced image level, and the image level comprise a color level (e.g., the digital image is made up of a plurality of pixels, each pixel being represented by an n-bit word. In a typical 24-bit word representing RGB color space, for instance, eight bits represent a red component, eight bits represent a green component and eight bits represent a blue component, column 2, lines 7-14. Note: examiner interprets that each color component has 8 bits and the combination of color components to represent a full image level, and the reduced image level.).

Regarding claim 25, Maurer discloses wherein one or more of the full image level, the reduced image level, and the image level comprise a gray level (e.g., the digital image is made up of a plurality of pixels, each pixel being represented by an n-bit word. In a typical 24-bit word representing RGB color space, for instance, eight bits represent a red component, eight bits represent a green component and eight bits represent a blue component, column 2, lines 7-14. Note: examiner interprets that each color component has 8 bits, which has 255 gray scale for each color component).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

Art Unit: 2625

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang N. Vo whose telephone number is (571)270-1121. The examiner can normally be reached on 7:30AM-5:00PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on (571)272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Q. N. V./

Application/Control Number: 10/695,327

Page 18

Art Unit: 2625

Examiner, Art Unit 2625

/David K Moore/

Supervisory Patent Examiner, Art Unit 2625